71461 PE
WO

(12) UK Patent Application (19) GB (11) 2 257 932 (13) A

(43) Date of A publication 27.01.1993

(21) Application No 9116199.2

(22) Date of filing 26.07.1991

(51) INT CL[5]
C02F 1/48, B03C 1/02

(52) UK CL (Edition L)
B2J JN J105 J305 J306
U1S S1443

(56) Documents cited
EP 0392097 A WO 90/01463 A US 4818395 A
US 4367143 A US 4265754 A
Permanent magnets in theory and practice,Malc Im McCaig, Pentech Press, 1977,pp114-119 & 355

(58) Field of search
UK CL (Edition K) B2J JA JC JN
INT CL[5] B03C 1/00 1/02, C02F 1/48
On-line databases: WPI

(71) Applicant
John Arthur Frank Blackman
"Lowlands", 10 West End Avenue,
Brundall, Norwich, NR13 5RF, United Kingdom

(72) Inventor
John Arthur Frank Blackman

(74) Agent and/or Address for Service
John Arthur Frank Blackman
"Lowlands", 10 West End Avenue,
Brundall, Norwich, NR13 5RF, United Kingdom

(54) **Magnetic water conditioning device**

(57) A pair of arc or semi-circular ferrite magnets (3) covered in suitable plastic material (5) that can be formed into a hinge (1). This allows the device to fit externally over a variety of pipe sizes or fittings (FIG 3.), and so conditions the water that passes through those pipes. The magnets are arranged with opposite poles adjacent, so that the strong magnetic field holds device permanently in position. In an embodiment (Figures 5 & 6) two semi-circular magnets are fixed to a pipe by moulding or clips.

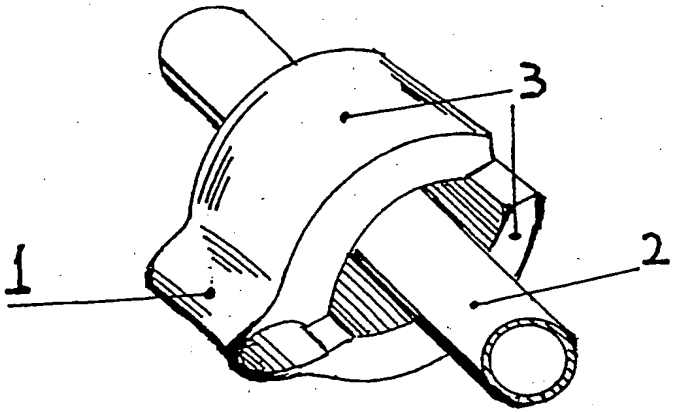

FIG. 1.

GB 2 257 932 A

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

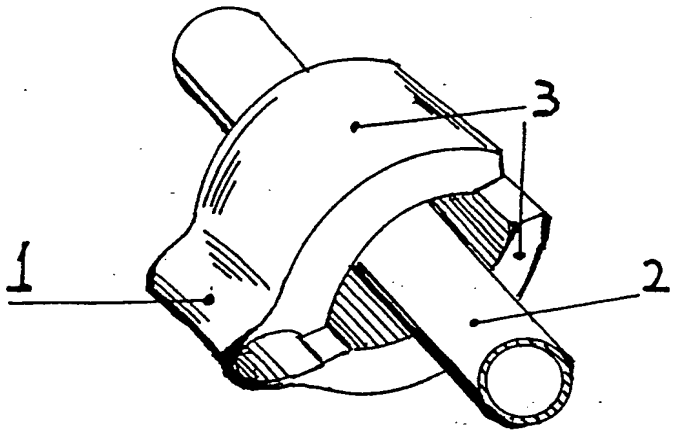

FIG. 1.

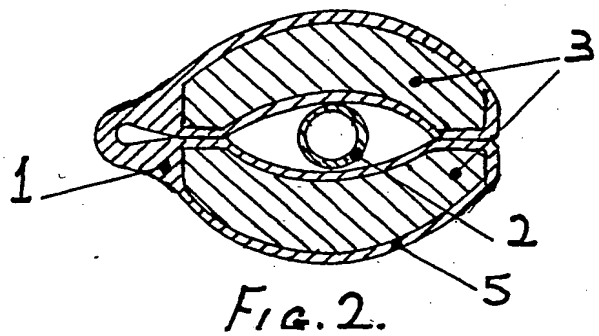

FIG. 2.

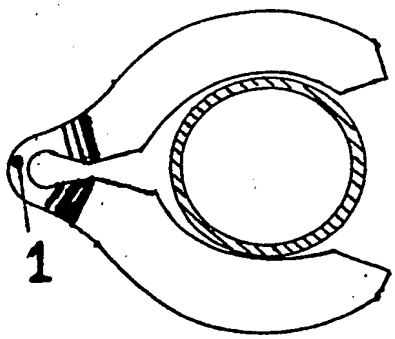

FIG. 3.

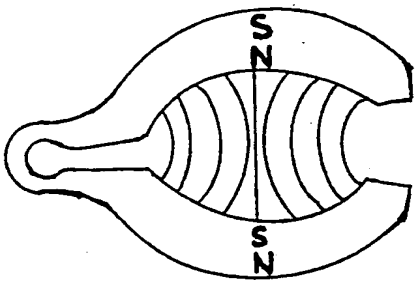

FIG. 4.

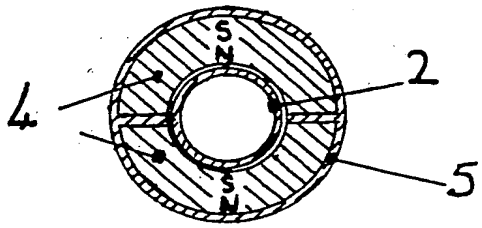

FIG. 5.

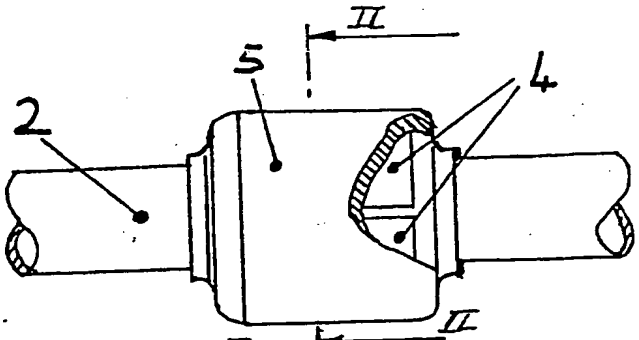

FIG. 6.

DESCRIPTION

WATER CONDITIONING DEVICE

This invention relates to devices for conditioning water and in particular to devices for inhibiting or reducing the scale to surfaces within water systems and appliances. The formation of scale on surfaces is a problem in homes and work places, and will occur on the surfaces of kettles, washing machines, water heaters, liquid vending machines and other devices found in the home and work place. The scale may be caused by "hard" water, that is to say, water containing such salts of calcium and mangnesium etc.which precipitate as calcium and magnesium carbonate at heat transfer surfaces. The present invention provides a device which can be installed on typical cold water supply pipes and on one or more devices or appliances that are installed in the home or work place in order to provide suitable protection. In accordance with the present invention, an apparatus is provided for inhibiting the formation of scale on surfaces contacted by water. It consists of a pair of permanent anisotropic strontium ferrite magnets preferably magnetised radially, or magnets giving similar magnetic fields and properties, focusing the magnetic field directly into the copper or plastic pipe containing the water. The magnetic field force to size ratio of anisotropic strontium magnets is such that only relatively small magnets are required.

Advantageously, this enables the present invention to be used in situations where space is at a premium, pipe sizes vary and it will fit over irregular surfaces, and still function correctly.

The apparatus is normally comprised of two permanent magnets, which will be placed either side of the pipe, the strong magnetic field holding the magnets firmly in place.

In one embodiment the permanent magnets are located externally to the water system. Advantageously, the arc segment permanent magnets will be coated, covered, moulded or encapsulated in a suitable plastic material, preferably in pairs. Pairs of arc segment permanent magnets when covered or encapsulated will be joined at one end only, so that at one end the plastic or covering material forms a natural hinge, thus allowing the permanent magnets to take up the correct position on a variety of different size pipes.

In another embodiment, the pairs of arc segment or semi-circular permanent magnets are located externally to the water system.

Advantageously, the high magnetic field strength of anisotropic strondium ferrite magnets is such that a relatively small pair of permanent magnets can be placed around a pipe and moulded permanently to the pipe, alternatively the permanent magnets can be clipped or fixed to the pipe.

The invention is described further hereinafter, by way of example only, with reference to the accompanying drawings in which:-

Fig.1. is a perspective view of a device fitted around a pipe in accordance with the present invention.

Fig.2. is a cross section through the device of Fig.1.

Fig.3. is an end view of the device of Fig.1.

Fig.4. is an end view illustrating the magnetic field lines when radially magnetised.

Fig.5. is a cross section II of Fig.6.

Fig.6. is a side elevation with cut away showing magnets, illustrating the device in a situation suitable for small appliances, or where space is at a premium.

The device illustrated in the drawings is comprised of two arc segments of anisotropic strontium ferrite permanent magnets, each having poles as shown in Fig.4. and Fig.5.(N indicates the North Pole and S indicates the South Pole.) As shown in Fig.1. and Fig.2., each arc segment magnet 3 will be coated, covered, encapsulated or moulded in suitable plastic material 5, leaving an open end at one end where the two arc's meet, and at the other end the plastic material is formed in such a way to form a natural hinge 1. thus allowing the device to open and accept varying sizes of pipes 2, and shapes, Ref.Fig.2. and Fig.3.

In Fig.6. pipe 2 is encompassed by two arc segment or semi-circular magnets 4, the magnets are then fixed to pipe 2 by moulding 5, encapsulation,covering or by use of suitable fixings or clips

CLAIMS

1.A device for inhibiting the formation of scale on surfaces contacted by water, the device comprised of two arc or semi-circular anisotropic strontium ferrite magnets that are radially magnetised and placed externally to any non-ferrous pipe or installation through which water flows. The magnets are arranged to provide a strong magnetic field through which any water flow has to pass.

2.A device according to Claim 1 in which the magnets are contained within a covering member for protection against abrasion and damage,and to maintain their correct position in relation to water flow.

3.A device according to Claim 1 and Claim 2 has a covering member of plastic that also forms a hinge at one end, leaving an open adjustable end.

4.A device according to Claim 1 and Claim 2 in which the adjacent magnets are arranged with opposite poles adjacent, with an existing pipe or fitting between them.

5.A device according to Claim 1 and Claim 2 that has sufficient magnetic strength to hold the device in the required position in most circumstances without resorting to other forms of mechanical fixing.

6.A device for inhibiting the formation of scale on surfaces contacted by water substantially as herein described with reference to the accompanying drawings.

7.A water conditioning system incorporating a device as claimed in any of the preceding claims.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
9116199.2

Relevant Technical fields

(i) UK Cl (Edition K) B2J (JA,JC,JN)

(ii) Int Cl (Edition 5) C02F (1/48), B03C (1/00,1/02)

Search Examiner
J L FREEMAN

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES WPI

Date of Search
26-09-91

Documents considered relevant following a search in respect of claims 1 to 7

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	EP 0392097 A (I. MASASHI) page 3 line 18	
Y	WO 90/01463 A (H. RIESEN) all figures	
Y	US 4818395 A (E. SCHULZE & E. RUDOLPH) column 1 line 5 and column 2 line 22	
Y	US 4367143 A (R.K. CARPENTER) column 2 line 43, column 3 line 67 and column 4 line 2	
Y	US 4265754 A (H.E. MENOLD) column 3 line 10	
Y	Permanent magnets in theory & practice, Malcolm McCaig, Pentech Press, 1977, pages 114 to 119 and 355	

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.

BNSDOCID: <GB___2257932A__I_>